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ABSTRACT

This research paper based upon a thesis of the same title examines whether a statistically significant difference exists between computer literacy test scores for those students having a microcomputer in the home and those who do not. Relationships between student gender, adult education level, adult occupation, adult computer use, educational software, and computer brands and their relationship to the test scores are also examined. Data were collected from 693 seventh grade students in a Missouri junior high school who were administered the Northwest Regional Educational Laboratory Computer Literacy Test Grade Seven and a researcher developed survey designed to collect demographic data. The data were analyzed using the ANOVA Statistical Analysis System package, and statistically significant differences were found at the .05 level between the computer literacy scores of students who had educational software at home and those who did not. A relationship between the educational level, occupation, and use of computer by the male adult in the home and the test scores was also identified, although the gender of the student was not found to be related to literacy test scores. No trend was found toward ownership of a particular brand of computer. A review of the literature and the student survey questionnaire are included. (RP)

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THE EFFECT OF MICROCOMPUTERS IN THE HOME ON COMPUTER LITERACY TEST SCORES

A Research Paper

based upon a Thesis

Presented to

the Department of Library Science and

Information Services

Central Missouri State University

In Partial Fulfillment

of the Requirements for the Degree

Education Specialist

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by

Judith A. Sparks

November 1986

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ABSTRACT

The purpose of this study was to determine if a significant difference exists between computer literacy test scores for students having a microcomputer in the home and those students not having a microcomputer in the home. Data were collected from 693 seventh grade students using the Northwest Regional Educational Laboratory Computer Literacy Test Grade Seven and a researcher designed survey. The collected data were analyzed using the ANOVA Statistical Analysis System package to determine if the means of the variables were significantly different at the .05 level. Analysis of the data indicated that there was a statistical difference between computer literacy test scores for those students having microcomputers in the home and those without microcomputers in the home. The gender of the student was not related to literacy test scores. The educational level, occupation and use of the computer by the male adult in the home was related to student computer literacy test scores. Use of the microcomputer in the home by the student was significantly related to computer literacy test scores, however, only educational software (i.e., drill and practice software) was significantly related to student literacy test scores. There did not seem to be a trend toward ownership of one particular brand of computer.

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Introduction

Today's society is shifting from an Industrial Age to an Information Age. For many people this means handling information instead of objects more and more of the time. According to Hunter (1984):

> Computer and communications technologies are the dramatic and visible signs of the information revolution. Thus, 'computer literacy' has become the focus for many educators seeking to adapt schools to the new age (p. 5).

Because of the influx of computers in the home and workplace, computer literacy is becoming a critical issue for students and educators. Teachers and parents in increasing numbers believe knowing about and how to use computers will enable students to function more effectively and productively in this changing society.

Statement of the Problem

The problem was the lack of information regarding the influence of home microcomputers on student computer literacy. This gap creates problems for teachers and administrators in curriculum design, budgeting decisions, homework assignments, and related activities.

Purpose of the Study

The purpose of this study was to determine whether microcomputers in the home influence computer literacy test scores of beginning seventh grade students. In addition, the relationships between gender and literacy scores, relationships between the educational level, and occupation

of the parents and student computer literacy test scores were determined.

Limitations of the Study

1. This study involved only seventh grade students from one midwestern, suburban school district.

2. Students came to the seventh grade building from eight different elementary schools, and differences existed in previous computer exposure in the educational environment.

3. Five different teachers administered the computer test and survey. Minor variations in testing techniques may have influenced scores. Efforts were made to compensate for the effects of proxy test administration.

4. Computer literacy tests and surveys were given each hour of one school day. The time variation may have affected scores because of subjects susceptibility to exhaustion in classes scheduled late in the day.

Definition of Terms

Home microcomputer - Those computer systems that can do more than play video games, and that are used primarily in the home.

Computer literacy - "Cultural phenomenon which includes the full range of skills, knowledge, understandings, values and relationships necessary to function effectively and comfortably as a citizen of a computer based society" (Seidel, Anderson & Hunter, 1982, p. 25). Computer literacy

is a variable determined by the Computer Literacy Test Grade Seven (1984).

Hypotheses

It was assumed that the variables identified would not affect microcomputer literacy scores of seventh grade students. The null hypotheses were tested and determined significant at the .05 level.

Ho_1: There is no difference between computer literacy test scores for those students having microcomputers in the home and those without microcomputers in the home.

Ho_2: The gender of the student is not related to microcomputer literacy test scores.

Ho_3: The educational level of the adults living in the home has no effect on computer literacy test scores.

Ho_4: The occupation of the adults in the home is not related to computer literacy test scores.

Ho_5: Use of the microcomputer by the adults in the home is not related computer literacy test scores.

Ho_6: Use of the microcomputer in the home by the student is not related to computer literacy test scores.

Ho_7: The types of software available in the home is not related to computer literacy test scores.

Significance of the Study

Many educators, microcomputer manufacturers and parents believe the use of microcomputers in the home has a positive

influence on computer literacy skills considered essential for individuals to function productively in the information age. However, there is a lack of empirical research to confirm this supposition. It is hoped that this study will give more insight regarding the effect of home computers on student computer literacy.

Review of the Literature

Research on computers in education has focused on how computers are used in education, the effectiveness of computer assisted instruction and the effect computer related courses have on computer literacy (Klassen et al. 1980). Two computer information searches and two manual searches of the literature led the researcher to believe that to date, there has been no research regarding the relationship between microcomputers in the home and computer literacy of students as measured by a standardized test. Marlaine Lockheed (1983) explored determinants of microcomputer literacy among high school students, however, her study measured gains in computer literacy of those students enrolled in a computer literacy course as opposed to measuring the level of literacy achieved by students prior to formal computer instruction. She found, "Access to and experience with computers were generally unrelated to gain in computer literacy" (p. 14).

Experts in computer and information science first began suggesting that all people need some knowledge of computers

in the 1960s. In the 1970s questions were raised regarding the place of computers in education and their use. In its 1972 report, the Conference Board of the Mathematical Sciences Committee on Computer Education recommended universal computer literacy.

In the 1980s the debate continues regarding the use of microcomputers in education. Most educators and parents believe that today's children will grow up in an increasingly computerized world and that soon computer literacy will be as important as reading skills are today (Bourque, 1982). There are, however, some who question the value of computers in schools. According to Culliton (1985), Derek Bok believed computers limit students' imagination, and that the only value of computers is that they force educators to think about what is happening in education. Still others believe computer courses are unnecessary because the knowledge needed for many jobs can be acquired in a week or two of on the job training (Noble, 1984).

Educators have a difficult time agreeing how computers should be used in education. These educators also do not always agree upon a definition of computer literacy. Definitions for computer literacy are found throughout the literature. Bork (1985) defined computer literacy as "the minimum knowledge, know-how, familiarity, capabilities, abilities, and so forth about computers essential for a

person to function well in the contemporary world" (p. 33). Ronald E. Anderson et al. (1982) distinguished between a narrow and comprehensive view of computer literacy. "The narrow view is that computer literacy is simply a matter of doing things with a computer; the comprehensive view is that it is an understanding of computers that enables one to evaluate computer applications as well as to do things with them" (p. 19). Authur Luehrmann (1981) likened computer literacy to literacy in a language.

The proliferation of home computers and their impact on education, computer literacy and the marketplace is another consideration for educators in the 1980s. The absence of studies which point to the benefits of learning with a home computer is an obstacle to parents, however, there were more than twelve million (Reed, 1985, p. 30) computers in American households by the mid 80s. A study of 20 New England families by Joseph Giacquenta cited in Phi Delta Kappan (Parents, 1984) found parents hoped by purchasing home computers their children would have an advantage at school, in college and eventually in the workforce. Constance Holden (1984) found most home computer buyers of computers costing more than $500 are white, well-educated and have incomes over $40,000.

According to an article in Phi Delta Kappan (Parents, 1984), parents are finding they can give children more time on computers at home than they get at school. As the number

of computers in homes increases, "homes may become a major site of education" (Bork, 1985, p. 170). Some aspects of traditional school learning may move into the home and parents will have a greater control over what their children learn. Parents will be actively involved in the educational experience (Bork, 1985). "Thus, the home computer may well become the primary influence upon the educational system of the future" (p. 170).

Methodology

Population

The population studied was approximately 700 seventh grade students enrolled at Hall-McCarter Junior High School in Blue Springs, MO. These students were chosen because all seventh grade students in the Blue Springs district attend Hall-McCarter Junior High and parents often ask the faculty if it is an advantage or vital for the students to have a computer at home in order to do well in the computer literacy curriculum taught at Hall-McCarter Junior High.

Data Collection and Instrumentation

Data were collected from all seventh grade students enrolled in regularly scheduled math classes using the Northwest Regional Educational Laboratory Computer Literacy Test Grade Seven (CLTGS). The test contained 50 questions. The following statistical information is given for the test:

Mean = 24.61 (49%)
Standard Deviation = 5.77
Reliability = .76
Standard Error of Measurement = 2.83 (Gabriel, 1984, p.25).

A researcher prepared survey to collect the demographic variables was also given.

Treatment of the Data

The data collected from the computer literacy test and survey were analyzed at the computer center at Central Missouri State University using the ANOVA Statistical Analysis System (SAS) package to determine if the means of the variables were significantly different.

$$F = \frac{MS_b}{MS_w}$$

If $p < .05$ the null hypothesis was rejected.

Analysis and Interpretation of Data

Findings: Demographic Data

Of the student population, 36% have microcomputers in the home. The mean score for all students on the CLTGS for boys was 26.413 and for girls was 26.479.

The difference in the means for those students with microcomputers in the home who reported use by the adults in the home indicated that male use of computers in the home had a greater influence over student scores than did female use of micros in the home.

Mean scores were most influenced by the ownership of games and educational software with a 1.90 and 1.02 difference in the means, respectively.

Findings: Test Data

Computer literacy test scores using the Northwest Regional Educational Laboratory Computer Literacy Test Grade Seven were obtained for 693 seventh grade students at Hall-McCarter Junior High School. Total possible points were 50. The mean for this population was 26.44, S.D. 5,96, as opposed to the mean of 24.61, S.D. 5.77 for the field test sample (Gabriel, 1984, p.25).

Analysis of Variance

Stated in the null, the following hypotheses were tested using one way analysis of variance for the .05 level.

Ho_1: There is no difference between computer literacy test scores for those students having microcomputers in the home and those without microcomputers in the home.

The hypothesis was rejected with a significant difference, p = .0001, at the .0001 level. Having a microcomputer in the home did significantly affect microcomputer literacy scores for this population.

Ho_2: The gender of the student is not related to microcomputer literacy test scores.

The hypothesis was not rejected, p = .8867, as there was no significant difference at the .05 level. Gender was not a factor in the mean scores.

Ho_3: The educational level of the adults living in the home will have no effect on computer literacy test scores.

Collorary I: The hypothesis was rejected for adult males as there was a significant difference, p = .0001, at the .0001 level. The educational level of the male adult in the home was a factor in mean scores.

Collorary II: The hypothesis was rejected for adult females as there was a significant difference, p = .0001, at the .0001 level. The educational level of the female adult in the home was a factor in mean scores.

Ho_4: The Occupation of the adults in the home is not related to computer literacy test scores.

Collorary I: The hypothesis was rejected for adult males as there was a significant difference, p = .0001, at the .0001 level. The occupation of the adult male in the home was a significant factor in computer literacy scores.

Collorary II: The hypothesis was rejected for adult females as there was a significant difference, p = .0001, at the .0001 level. The occupation of the adult female in the home was a significant factor in computer literacy scores.

Ho_5: Use of the microcomputer by the adults in the home is not related to computer literacy test scores.

Collorary I: The hypothesis was rejected for adult males as there was a significant difference, p = .0246, at the .05 level. Whether or not the adult male in the home

used the computer was a significant factor in computer literacy test scores.

Collorary II: The hypothesis was not rejected for adult females as there was no significant difference, p = .2027, at the .05 level. Whether or not the adult female in the home used the computer was not a significant factor in computer literacy test scores.

Ho_6: Use of the microcomputer in the home by the student is not related to computer literacy test scores.

The hypothesis was rejected as there was a significant difference, p = .0333, at the .05 level. Whether or not the student used the computer in the home was a significant factor in computer literacy test scores.

Ho_7: The types of software available in the home is not related to computer literacy test scores.

Collorary I: The hypothesis was not rejected for video games as there was no significant difference, p = .1049, at the .05 level. Having video games in the home did not significantly influence microcomputer literacy scores.

Collorary II: The hypothesis was not rejected for word processing software as there was no significant difference, p = .0859, at the .05 level. Having word processing software in the home did not significantly influence microcomputer literacy scores.

Collorary III: The hypothesis was rejected as there was a significant difference, p = .0005, for educational

software at the .001 level. Having educational software in the home significantly affected student computer literacy scores.

Collorary IV: The hypothesis was not rejected as there was no significant difference, $p = .0564$, for software used to prepare the family budget at the .05 level. Having software to prepare the family budget in the home did not significantly influence microcomputer literacy scores.

Discussion

The ANOVA statistic indicated the presence of microcomputers in the home had an effect on computer literacy test scores. This was in contrast to the findings of Marlaine Lockheed (1983) who found access to computers unrelated to gain in computer literacy among high school students.

According to the data, gender did not influence literacy scores. The researcher found this to be interesting since much has been written regarding gender differences in computer use, access to and attitudes toward computers.

The educational level and occupation of the adults living in the home seemed to be related to student literacy scores. Since the respondents in this study were twelve years old, some problems were encountered in identifying the exact occupational classification for the adults in the home. The impact of occupation should, therefore, be

considered in general terms only, not by specific classification. One can only speculate that perhaps the higher the educational level, the more likely it is that a microcomputer would be in the home. Statistical data indicated only that educational level and occupation relate to student literacy scores, but a more specific relationship is not known. If this speculation is correct, then this research would seem to support the previous research of Holden (1984) and Naiman (1985), who found most computers were located in upper-class and middle class homes but seldom in blue-collar homes.

The data indicated that use of the computer by the male adult in the home seemed to influence student test scores, however, use by the female adult in the home did not seem to influence scores. This finding prompted further analysis of the data by gender for students who reported having microcomputers in the home and who indicated the adults in the home used the microcomputer. ANOVA statistics indicated no significant difference between mean scores based upon the gender of the student having a microcomputer in the home and the gender of the adult using the computer in the home. There was a significant difference between the mean scores for those students who indicated either adult used the computer in the home and those who reported no adult use of the computer.

Whether or not the student used the computer at home seemed to influence test scores, although the only type of software which appeared to influence scores was educational software. For many computer owners, educational software (i.e., drill and practice) is the first software purchased for the computer because it is easy to use and requires little computer knowledge. This could be a possible explanation for the finding relevant to educational software in this study. The other types of software require more sophisticated computer skills and may be less accessible for some brands of microcomputers which students have in their homes.

There did not seem to be a pattern of ownership of one particular brand of computer. Cost of the computer seemed to be a determining factor in the purchase of a home computer in that the brands falling into the lower cost levels appear to be most prevalent.

Summary, Conclusions and Recommendations

Summary

The purpose of this study was to determine if a significant difference exists between the mean scores on the Northwest Regional Educational Laboratory Computer Literacy Test Grade Seven for those students having a microcomputer in the home and those students not having a microcomputer in the home. Data collected from 693 seventh grade students at Hall-McCarter Junior High in Blue Springs, MO. The CLTGS

and a researcher designed survey were administered during the regular math classes by the classroom teacher.

The data collected were analyzed using the ANOVA Statistical Analysis System (SAS) package to determine if the means of the subpopulations were significantly different.

Conclusions

After careful analysis of the data the following conclusions have been drawn regarding the population of this study:

1. There was a statistical difference between computer literacy test scores for those students with microcomputers in the home and those without microcomputers in the home.

2. The educational level and occupation of the adults in the home have a significant effect on student computer literacy test scores.

3. Use of the microcomputer in the home by the adult male is related to student literacy test scores, however, use of the computer by the adult female is not statistically significant.

4. Use of the microcomputer in the home by the student is significantly related to computer literacy test scores.

5. With the exception of educational software, the types of software in the home is not significantly related to student literacy test scores.

Recommendations

The writer has identified several factors which seem to influence student computer literacy. Based upon the findings of this study, the following recommendations are made:

1. Curriculum decisions regarding the types of courses to offer should be based upon student needs.

2. Further research is necessary to identify the patterns of student use of computers and the relationship between this use and literacy. Additional research is also needed to access the influence this use may have on subject content areas.

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Appendix

STUDENT QUESTIONNAIRE

CIRCLE THE ANSWERS TO THE FOLLOWING QUESTIONS:

1. Do you have a microcomputer in your home?
   a. yes
   b. no

2. What is your gender?
   a. boy
   b. girl

3. Which elementary school did you attend in 6th grade?
   a. Cordill-Mason
   b. Daniel Young
   c. Franklin Smith
   d. James Lewis
   e. James Walker
   f. John Nowlin
   g. Thomas Ultican
   h. William Yates
   i. Other-Specify

4. Place an X next to the statement that best describes the education of the adults who live in your home?

	M	F
a. Did not complete high school.	____	____
b. Graduated from high school.	____	____
c. Attended college or some other school after high school.	____	____
d. Graduated from college.	____	____
e. I don't know.	____	____

5. Place an X next to the statement best describes the occupations of the adults who live in your home?

	M	F
a. Professional (doctor, teacher nurse, manager, accountant, etc.)	____	____
b. Clerical & sales (secretary, salesperson, etc.)	____	____
c. Service (restaurant work, barber, housekeeper, custodian, cook, etc.)	____	____
d. Agricultural (farm, forestry, fishery, etc.)	____	____
e. Processing (factory work, printing, etc.	____	____
f. Construction (builder, welder, electrician, etc.)	____	____
g. Homemaker	____	____
h. Not employed	____	____

ANSWER THE FOLLOWING QUESTIONS ONLY IF YOU HAVE A COMPUTER IN YOUR HOME. CIRCLE THE CORRECT ANSWER.

6. Which of the following best describes how long you have had your computer?
   a. Less than three months.
   b. Less than six months.
   c. Less than one year.
   d. More than one year.

7. Does adult M use the computer in your home?
   a. Yes
   b. No

8. Does adult F use the computer in your home?
   a. Yes
   b. No

9. Do you use the computer in your home?
   a. Yes
   b. No

10. Does your family own video games for your computer?
    a. Yes
    b. No
    c. I don't know

11. Does your family own software that allows you to write reports on your computer? (Word processing)
    a. Yes
    b. No
    c. I don't know

12. Does your family own educational software? (Those that help you learn math or spelling are examples)
    a. Yes
    b. No
    c. I don't know

13. Does your family own software that an adult in your house uses to figure the family budget?
    a. Yes
    b. No
    c. I don't know

14. Which brand of computer do you have in your home? If you have more than one, circle all brands that you have.
    a. Adam
    b. Apple
    c. Atari (400, 800, 1200 are examples)
    d. Commodore
    e. IBM
    f. Tandy (Radio Shack)
    g. Texas Instrument
    h. Timex
    i. Other - Specify type.